

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 September 2003 (25.09.2003)

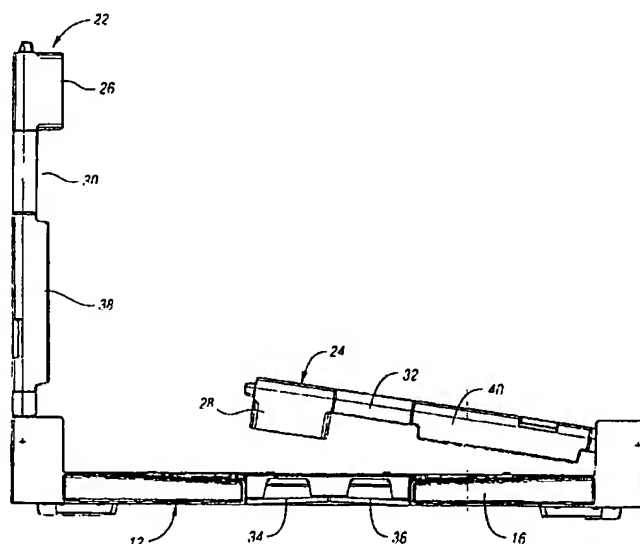
PCT

(10) International Publication Number
WO 03/078259 A1

- (51) International Patent Classification⁷: **B65D 6/18** (74) Agent: **DIAMOND, Konstantine, J.**; Rehrig Pacific Company, 4010 East 26th Street, Los Angeles, CA 90023 (US).
- (21) International Application Number: PCT/US03/03390
- (22) International Filing Date: 5 February 2003 (05.02.2003) (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10/077,543 15 February 2002 (15.02.2002) US
- (71) Applicant (*for all designated States except US*): **REHRIG PACIFIC COMPANY** [US/US]; 4010 East 26th Street, Los Angeles, CA 90023 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): **APPS, William** [US/US]; 225 Lake Heights Drive, Alpharetta, GA 30022 (US). **GRUBER, Robert** [US/US]; 5202 Mercedes Avenue, Dallas, TX 75206 (US).
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report

[Continued on next page]

(54) Title: COLLAPSIBLE CONTAINER



(57) Abstract: A collapsible container (10) includes a base member (12) having a pair of first base edges, and a pair of second base edges having a recessed base area formed therein. A pair of first opposed walls pivotally (18,20) attached to the first base edges and orientable between an upright orientation and an inwardly folded orientation. A pair of second opposed walls pivotally attached to the second base edges and orientable between an upright orientation and an overlapping folded orientation. Each of the second opposed walls (22,24) generally corresponding in height and having a projection member (26,28) arranged to be received within the recessed area (34,36) of the second base edges when in the overlapping folded orientation, and each side wall (22,24) has a recessed wall area (30,32) arranged to receive the projection member (26,28) of the second opposed wall (22,24) folded thereon.



WO 03/078259 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

COLLAPSIBLE CONTAINER

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 This invention relates to a collapsible container having at least one pair of opposed overlapping side walls.

2. Background Art

10 Some collapsible containers have walls which may be inwardly folded in order to stack the containers in an efficient and space-conserving manner when not in use. This efficient means of storage is most easily achieved when the container has walls which do not overlap. However, many collapsible containers have relatively tall walls which when assembled in their upright orientation, provide a large container volume and depth. Accordingly, when folded, at least one of the pairs of opposed walls will overlap. Unfortunately, the overlapping wall typically results in less efficient stacking of the collapsed containers, because the second overlapping wall will be forced to sit
15 high upon the first overlapping wall. Accordingly, the package height and the resulting stacking height of the collapsed unit will be relatively high.

Containers that attempt to resolve the overlapping issue have been restricted, often requiring that the walls be folded in a particular sequence, or by having an unsymmetrical design or walls of varied heights. Further, present collapsible
20 containers may not provide the desired level of airflow among adjacent containers.

Accordingly, a collapsible container is desired which is able to accommodate overlapping opposed walls such that they are able to be collapsed and stacked efficiently and comparable or better than those containers not having overlapping opposed walls. It would also be desired for the container to have enhanced airflow
25 among like containers.

SUMMARY OF THE INVENTION

It is an object according to the present invention to provide a collapsible container which provides for the walls to be collapsed in an efficient manner and a relatively low package height for purposes of stacking and storing.

- 5 It is another object according to the present invention to provide a collapsible container having at least one pair of opposed overlapping side walls which are able to be folded in an efficient manner to provide a relatively low package height.

It is yet another object according to the present invention to provide a container having overlapping side walls which may be folded down in a non-sequential manner.

- 10 It is another object to provide a container with a repeating pattern of openings for promoting air flow among adjacent containers in various cross-stacked orientations.

- In accordance with these objects, provided is a collapsible container having a base member having bottom wall, a pair of first base wall portions and a pair of
15 second base wall portions, the second base wall portions having a recessed base area formed therein. Also provided is a pair of first opposed walls pivotably attached to a corresponding one of the first base wall portions and orientable between an upright an upright orientation and an inwardly folded orientation. Further included is a pair of
20 second opposed walls pivotably attached to a corresponding one of the second base wall portions and orientable between an upright orientation and an overlapping folded orientation, each of the second opposed walls generally corresponding in height and each having at least one projection member arranged to be received within the recessed area of the second base wall portions when in the overlapping folded orientation, and wherein each second opposed wall has a recessed wall area arranged
25 to receive the projection member of an other second opposed wall folded thereon.

The pair of second opposed walls are preferably oriented parallel to each other when in the inwardly folded position. Further, each of the pair of second opposed

walls has a pivot axis of corresponding height from the base member. Further, each of the second opposed walls has a pivot axis disposed in a plane which is oriented generally parallel to the base member.

Also provided herein is a collapsible container including a base having a pair
5 of base side wall edges and a pair of base end wall edges, the base end wall edges having a recess formed therein. Further, provided is a pair of opposed end walls pivotably attached to respective end wall edges and orientable between an upstanding orientation and an inwardly collapsed orientation. Also provided is a pair of opposed
10 side walls pivotably attached to respective side wall edges along hinge axes having a corresponding height from the base, the pair of opposed side walls orientable between an upstanding position and an overlapping folded position. Each side wall has a lateral edge with an upper projecting flange and a recessed area, wherein the side walls may be inwardly foldable in a non-sequential order such that the flange of a first one
15 of the side walls when folded is arranged to be received within the recess of the base end wall edge, while the flange of a second one of the side walls when folded is received within the recessed area of the first one of the side walls, and wherein the side walls are oriented parallel to each other when in the overlapping folded position.

Preferably, the pair of opposed side walls are oriented parallel to each other when in the inwardly folded position. Also, the side walls are generally
20 corresponding in height. Also, each of the side walls has a pivot axis disposed in a plane which is oriented generally parallel to the base.

Further provided is a collapsible container having a base member with a bottom wall, a pair of first opposed edges and a pair of second opposed edges. Also provided is a pair of first opposed walls pivotably connected to the pair of first
25 opposed edges, and orientable between an upright orientation and an inwardly collapsed orientation. Provided also is a pair of second opposed walls each pivotably connected to the pair of second opposed edges along corresponding axes of rotation, wherein when oriented in an inwardly collapsed position, the second opposed walls overlap with each other in a parallel orientation, and the corresponding axes of rotation
30 are disposed in a plane generally parallel to the bottom wall of the base member.

The above objects and other objects, features, and advantages of the present invention are readily apparent from the following detailed description of the best mode for carrying out the invention when taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 illustrates a container according to the present invention showing the side walls in an upright and assembled orientation, wherein one pair of opposed side walls, when folded, result in a overlapping orientation;

FIGURE 2 illustrates a side elevational view of the container, wherein the side walls are oriented in an upright position as in FIGURE 1, and the non-overlapping end walls are shown in an inwardly collapsed orientation;

FIGURE 3 is similar to the view shown in FIGURE 2, but with one of the overlapping side walls rotated partially inward;

FIGURE 4 illustrates a view similar to FIGURE 3, but with one of the overlapping side walls rotated fully inward;

FIGURE 5 is a view similar to FIGURE 4 but with the second overlapping side wall shown rotated partially inward;

FIGURE 6 shows the container in its fully collapsed orientation;

FIGURE 7 illustrates a view similar to Figure 4, but will the opposed overlapping wall folded inwardly first;

FIGURE 8 illustrates a view similar to Figure 6, but with the walls folded in opposite order;

FIGURE 9 illustrates a view of the container according to the present invention similar to Figure 4, but having a plurality of inwardly projecting flanges; and

FIGURE 10 illustrates an elevational view showing end walls in the foreground, and sidewalls in the background, each having similar repeating patterns of openings to promote air flow through adjacent containers.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Figures 1 through 8 illustrate a collapsible container 10 in accordance with the present invention. Container 10 is rectangular in shape and is generally symmetrical about each center line. The components of container 10 are preferably formed by an injection molding process with a polymeric material such as polypropylene, but of course may be formed by any material and process suitable for the application. Container 10 includes a base 12 having a floor portion 13, a pair of first opposed base portions 14 defining first base edges along the sides of container 10, and a pair of second opposed base portions 16 defining second base edges along the ends of container 10.

Container 10 also includes a first pair of opposed walls, generally referred to as end walls 18, 20, each of which is pivotably connected to a corresponding base end portion 16, preferably by way of hinges representatively shown in Figure 1 as hinge 19. Also included is a second pair of opposed walls, designated as side walls 22, 24, which are pivotably connected to a corresponding base side portion 14, such as via hinges 19. Walls 22,24 have a corresponding height.

Figures 2 - 6 illustrate the improved overlapping wall feature according to the present invention. For ease of reference and explanation, Figures 2 - 8 illustrate an end elevational view of container 10, in which end walls 18, 20 have already been inwardly collapsed and are disposed proximate the upper surface of base 12, so that the aspects of the overlapping side walls 22, 24 may be focused upon. Each lateral edge of side walls 22, 24 has respectively, at least one upper inwardly extending flange 26, 28 and a recessed wall area 30, 32 disposed below flange 26.

Base end wall 16 includes a recessed base area 34, 36 centrally formed therein. With reference to Figures 3 - 6, as side wall 24 is rotated inwardly, its upper flange 28 rests within recessed base portion 34 (see Figures 3-4.) Note that side wall 24 in its fully folded position has an inclined angled orientation, such that lower side wall portion 40 is disposed in a generally parallel relationship with the corresponding angled upper surface 42 of base end portion 16.

Subsequently, with reference to Figures 5-6, end wall 22 is rotated inwardly, such that its upper flange 26 is received within the recessed area 32 of end wall 24. Thus, the walls in the fully collapsed position result in a highly efficient package height for container 10 while remaining symmetrical. With reference to Figure 6, note that when fully collapsed, side walls 22 and 24 are oriented parallel to each other, although the axis of rotation 48, 50 (hinge axis) of each side wall 22, 24 lie in a common plane generally parallel to base 12 (or in other words axes 48, 50 are disposed at the same height from base 12). Thus, the overlapping walls may be folded in any sequence.

Figures 7 through 8 illustrate the non-sequential character of the overlapping walls of container 10. Specifically, Figure 7 illustrates that end wall 22 may be inwardly folded first such that its upper flange portion 26 is received within recessed base area 36 of base end portion 16. Subsequently, side wall 24 is inwardly folded as shown in Figure 8 such that the orientation of walls 22, 24 are converse to those shown in Figure 6. Specifically, upper flange portion 28 of side wall 24 is received within recessed area 30 of side wall 22. As with the sequence shown in Figure 6, walls 22 and 24 remain parallel with each other in this orientation. Accordingly, the non-sequential folding of the side walls means improved handling and manipulation of container 10 by users. Also, the symmetrical design of container 10 provides for more cost-efficient manufacturing and assembly.

While the teachings according to the present invention have been represented by overlapping walls 22,24, it is fully contemplated that walls 18,20 may overlap instead of or in addition to walls 22,24 without departing from the teachings herein.

Figure 8 illustrates a view similar to Figure 4 of container 10', but wherein the lateral edges of sidewalls 22', 24' include a plurality of inwardly projecting flanges. Wall 22' includes flanges 26', 27' with recess 30' therebetween, while wall 24' includes flanges 28', 29' with recess 32' therebetween. Like container 10, walls 22', 24' are able to fold inwardly in a non-sequential manner. For example, sidewall 24' is folded inwardly such that flanges 28', 29' rest within base recesses 34', 36'. Subsequently, wall 22' is folded such that flange 26' of wall 22' rests within wall recess 32' of wall 24', while flange 27' is disposed on the other side of flange 28'. Again, the hinge axis heights of each wall is similar. Accordingly, it is illustrated that the container according may have various overlapping wall features, while still retaining its non-sequential overlapping wall feature.

Lastly, it is contemplated that when in the upright, assembled orientation, container 10 may be shipped or stored in cross-stacked layered configurations. Should the container have produce stored therein, it is desired to have sufficient airflow among adjacent containers in a layer regardless of their orientation. Thus it is illustrated in Figure 10 that container 10 includes a similar pattern of openings 60 along its sidewalls and openings 62 along its endwalls that repeat and are easily aligned, such that even if end walls 18 of one crate are proximate side walls 22 of an adjacent crate, the repeating pattern of openings 60, 62 are capable of being aligned to promote the flow of cooled air throughout the layer.

While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention.

WHAT IS CLAIMED IS:

- 1 1. A collapsible container comprising:
2 a base member having bottom wall, a pair of first base wall portions and a pair
3 of second base wall portions, the second base wall portions having a recessed base
4 area formed therein;
5 a pair of first opposed walls pivotably attached to a corresponding one of the
6 first base wall portions and orientable between an upright an upright orientation and
7 an inwardly folded orientation; and
8 a pair of second opposed walls pivotably attached to a corresponding one of
9 the second base wall portions and orientable between an upright orientation and an
10 overlapping folded orientation, each of the second opposed walls generally
11 corresponding in height and each having at least one projection member arranged to
12 be received within the recessed area of the second base wall portions when in the
13 overlapping folded orientation, and wherein each second opposed wall has a recessed
14 wall area arranged to receive the projection member of an other second opposed wall
15 folded thereon.
- 1 2. The collapsible container of claim 1 wherein the pair of second opposed
2 walls are oriented parallel to each other when in the inwardly folded position.
- 1 3. The collapsible container of claim 1 wherein each of the pair of second
2 opposed walls has a pivot axis of equivalent height from the base member.
- 1 4. The collapsible container of claim 1 wherein each of the second opposed
2 walls has a pivot axis disposed in a plane which is oriented generally parallel to the
3 base member.
- 1 5. A collapsible container comprising:
2 a base having a pair of base side wall edges and a pair of base end wall edges,
3 the base end wall edges having a recess formed therein;

4 a pair of opposed end walls pivotably attached to respective end wall edges
5 and orientable between an upstanding orientation and an inwardly collapsed
6 orientation; and

7 a pair of opposed side walls pivotably attached to respective side wall edges
8 along hinge axes having a corresponding height from the base, the pair of opposed side
9 walls orientable between an upstanding position and an overlapping folded position,
10 each side wall having a lateral edge with an upper projecting flange and a recessed
11 area, wherein the side walls may be inwardly foldable in a non-sequential order such
12 that the flange of a first one of the side walls when folded is arranged to be received
13 within the recess of the base end wall edge, while the flange of a second one of the
14 side walls when folded is received within the recessed area of the first one of the side
15 walls, and wherein the side walls are oriented parallel to each other when in the
16 overlapping folded position.

1 6. The collapsible container of claim 5 wherein the pair of opposed side
2 walls are oriented parallel to each other when in the inwardly folded position.

1 7. The collapsible container of claim 5 wherein the side walls are generally
2 corresponding in height.

1 8. The collapsible container of claim 5 wherein each of the side walls has
2 a pivot axis disposed in a plane which is oriented generally parallel to the base.

1 9. A collapsible container comprising:
2 a base member having a bottom wall, a pair of first opposed edges and a pair
3 of second opposed edges;
4 a pair of first opposed walls pivotably connected to the pair of first opposed
5 edges, and orientable between an upright orientation and an inwardly collapsed
6 orientation; and
7 a pair of second opposed walls each pivotably connected to the pair of second
8 opposed edges along corresponding axes of rotation, wherein when oriented in an
9 inwardly collapsed position, the second opposed walls overlap with each other in a

- 10 parallel orientation, and the corresponding axes of rotation are disposed in a plane
- 11 generally parallel to the bottom wall of the base member.

1/9

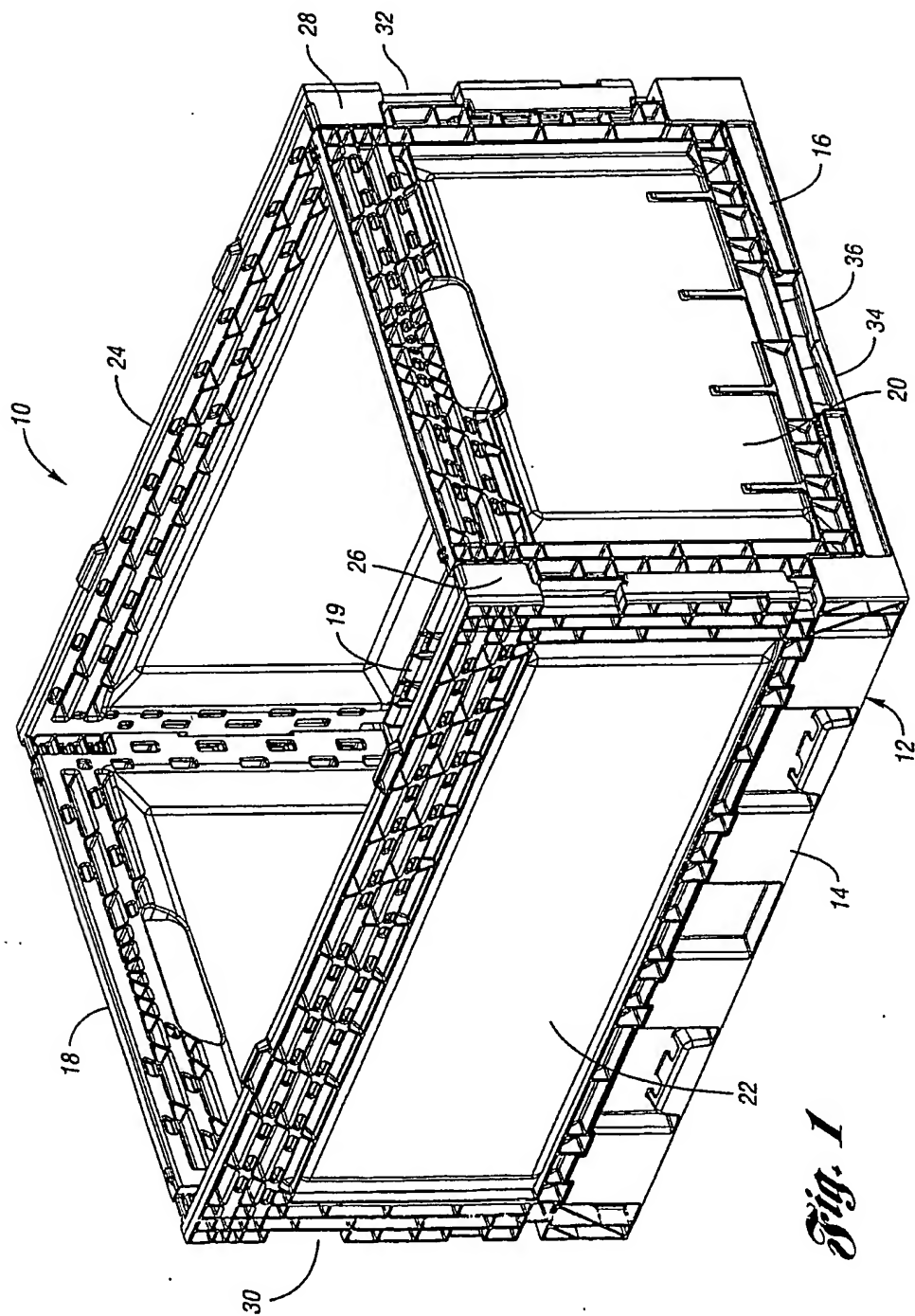


Fig. 1

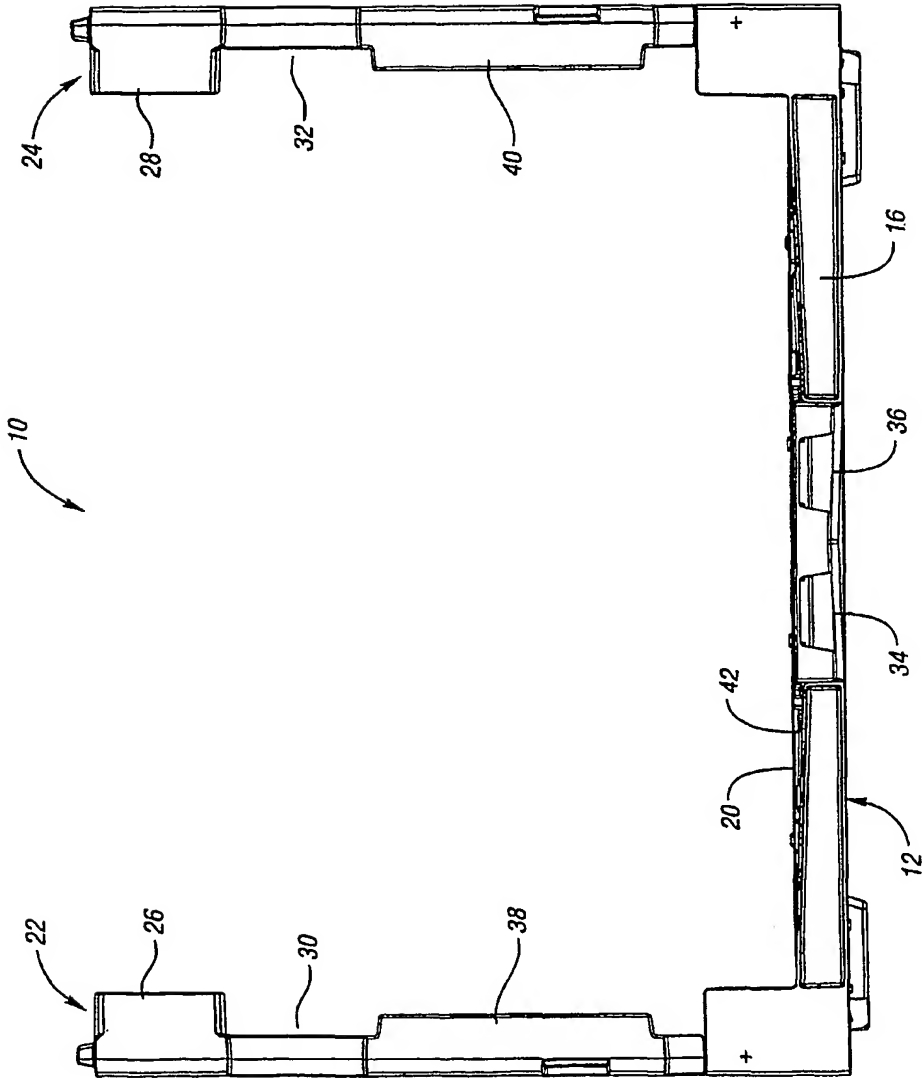


Fig. 2

3/9

Fig. 3

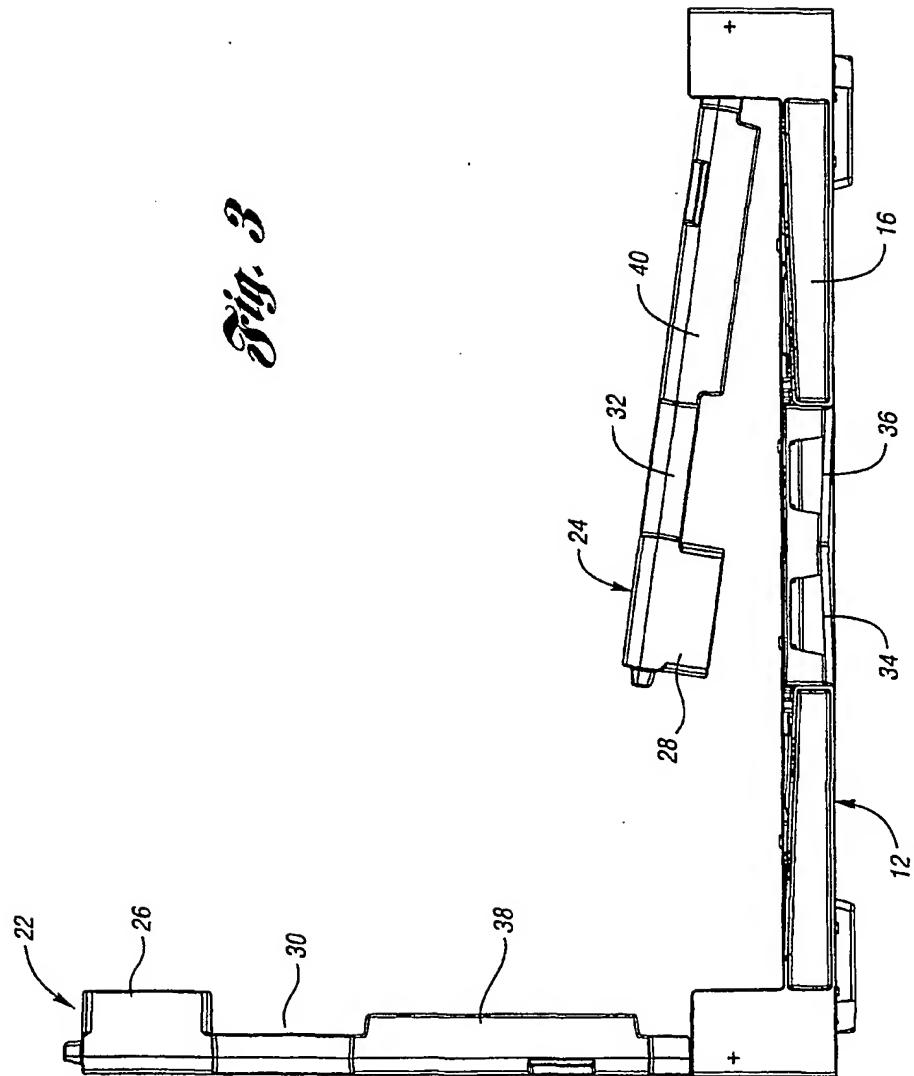
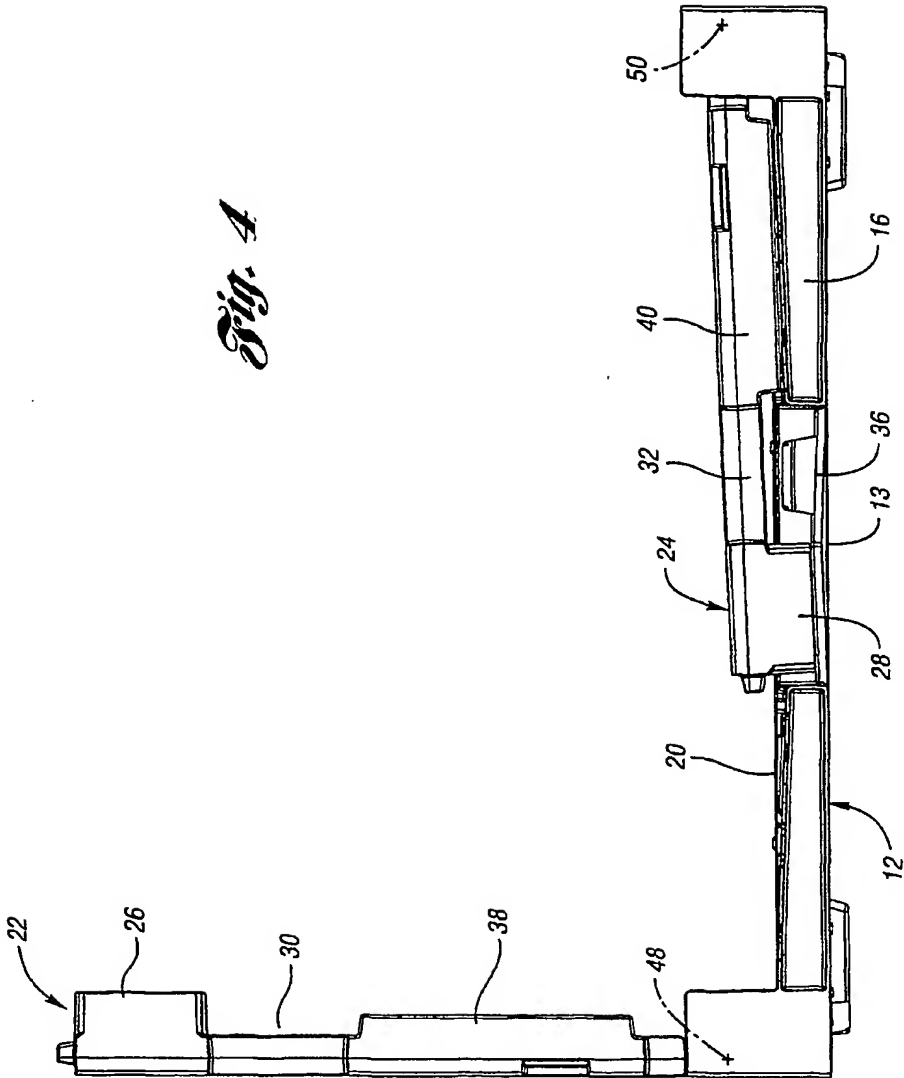
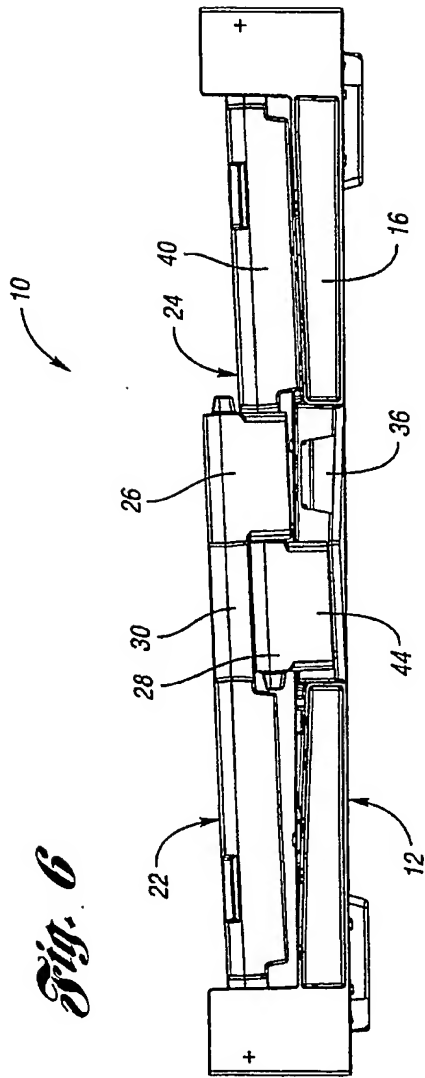
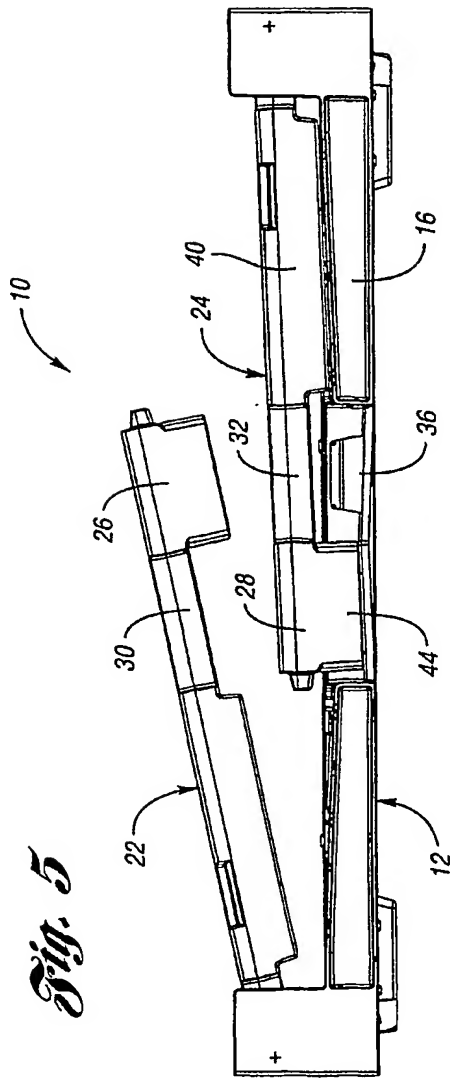
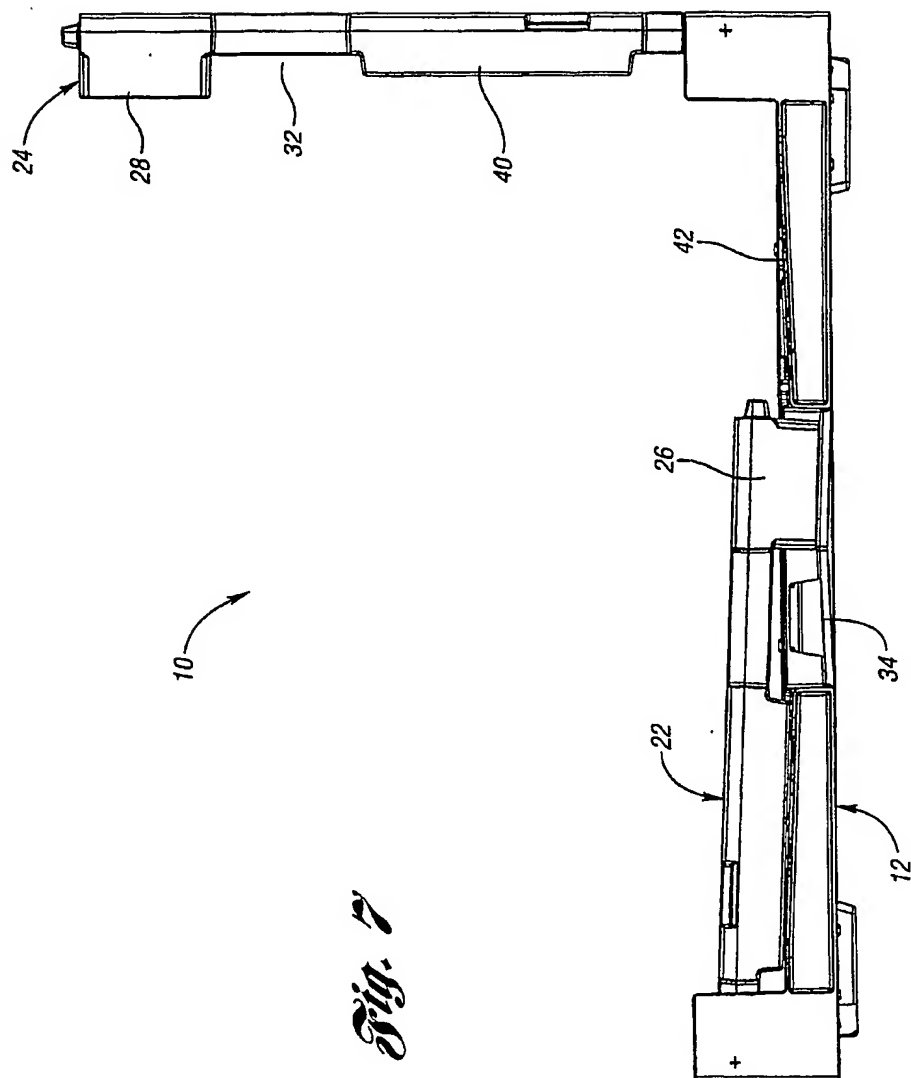


Fig. 4





6/9



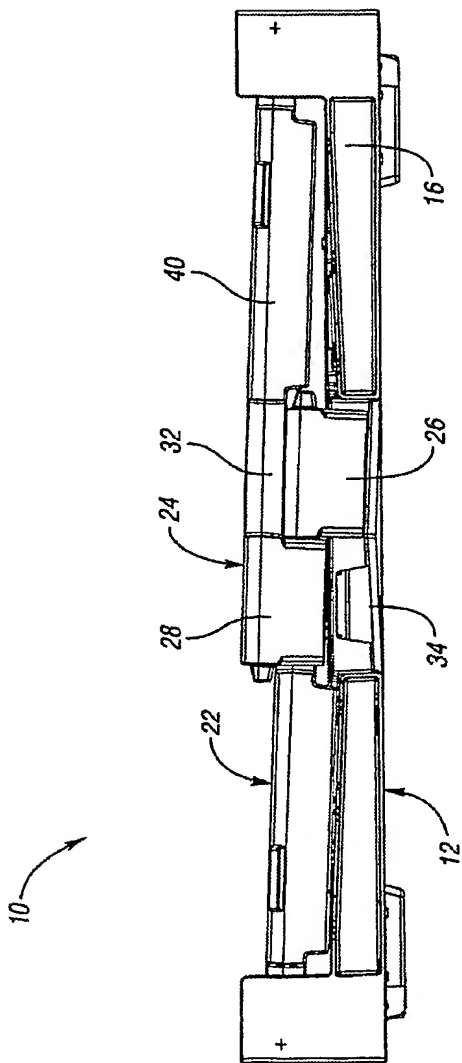
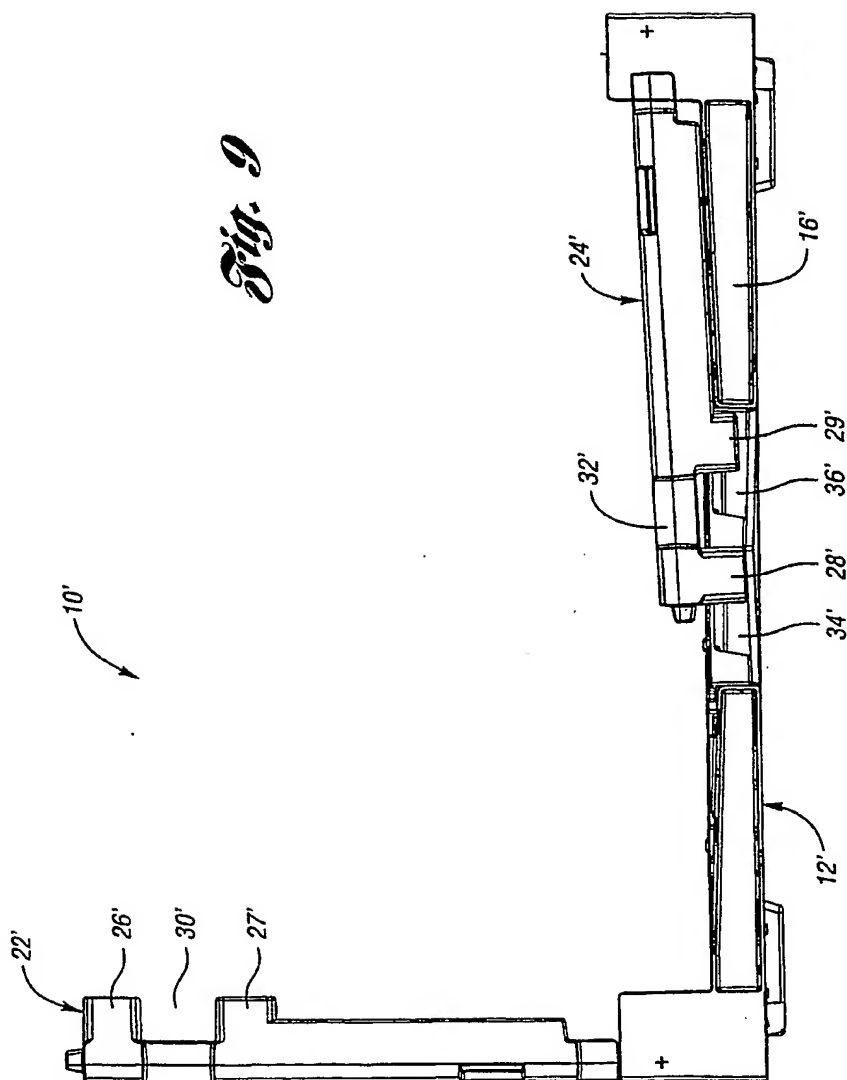


Fig. 8

Fig. 9



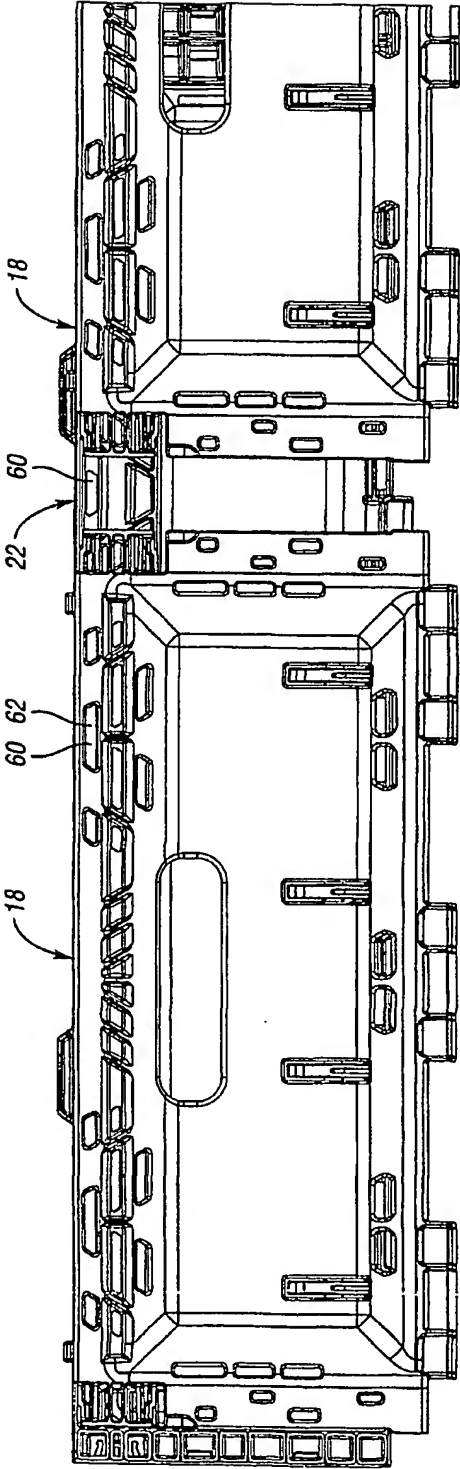


Fig. 10

INTERNATIONAL SEARCH REPORT

 Internatl. Application No
 PCT/US 03/03390

 A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B65D6/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

 Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 690 003 A (OTTO IND INC) 3 January 1996 (1996-01-03) figures 1,3-5,7,8 ---	1-9
X	US 5 975 324 A (SCHMITT PETER) 2 November 1999 (1999-11-02) column 1, line 5 - line 7 figures 9-11 ---	1-9
X	EP 0 385 914 A (ROPAK CORP) 5 September 1990 (1990-09-05) figures 1,13,14 ---	1-9
X	EP 0 404 041 A (TETRA PAK INC) 27 December 1990 (1990-12-27) figures 1-3 ---	1
A	-----	1-8

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

16 June 2003

Date of mailing of the international search report

25/06/2003

Name and mailing address of the ISA

 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Schultz, O

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/03390

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0690003	A	03-01-1996	US 5467885 A	21-11-1995
			US 5398835 A	21-03-1995
			EP 0690003 A1	03-01-1996
			EP 0690004 A1	03-01-1996
			AU 7906894 A	08-06-1995
			BR 9404779 A	08-08-1995
			CN 1112510 A	29-11-1995
			EP 0655392 A2	31-05-1995
			JP 7251838 A	03-10-1995
US 5975324	A	02-11-1999	DE 19615885 A1	24-07-1997
			AT 176648 T	15-02-1999
			AU 1541597 A	11-08-1997
			BR 9707023 A	28-12-1999
			DE 59601295 D1	25-03-1999
			WO 9726193 A1	24-07-1997
			EP 0785140 A2	23-07-1997
			ES 2128138 T3	01-05-1999
			NO 983236 A	11-09-1998
			NZ 326766 A	30-08-1999
EP 0385914	A	05-09-1990	US 4917255 A	17-04-1990
			CA 2007900 A1	24-08-1990
			DK 385914 T3	09-10-1995
			EP 0385914 A2	05-09-1990
			FI 95017 B	31-08-1995
			JP 2242741 A	27-09-1990
			JP 6033086 B	02-05-1994
			NO 900626 A ,B,	27-08-1990
			PL 163723 B1	29-04-1994
EP 0404041	A	27-12-1990	US 5076457 A	31-12-1991
			AT 118435 T	15-03-1995
			AU 632349 B2	24-12-1992
			AU 5944590 A	17-01-1991
			CA 2033986 A1	23-12-1990
			DE 69016846 D1	23-03-1995
			DE 69016846 T2	08-06-1995
			EP 0404041 A1	27-12-1990
			ES 2068284 T3	16-04-1995
			JP 7121741 B	25-12-1995
			JP 4500350 T	23-01-1992
			NO 910563 A ,B,	12-02-1991
			RU 2048389 C1	20-11-1995
			WO 9100222 A2	10-01-1991

THIS PAGE BLANK (USPTO)